

CLAIMS

1. A battery pack comprising:

a plurality of cells (2) stacked on top of one another in tiers;

5 a heat collecting plate (4, 7) made of a wave-like metal sheet, the heat collecting plate being interposed between tiers of the cells so as to make contact with part of an outer peripheral surface of each of upper and lower tiers of the cells alternately;

10 a heat pipe (10) having its heating portion (10a) fitted into a fitting groove (8, 9) formed in said heat collecting plate;

a pack case (1) for accommodating the cells, the heat collecting plate, and the heat pipe; and

15 a heat dissipating member (3) attached to said pack case so as to close an opening of the pack case, the heat dissipating member having on its inner-surface side a concavely-formed receiving groove (11) into which a heat dissipating portion (10b) of said heat pipe is fitted.

20 2. The battery pack according to claim 1, wherein the wave-like heat collecting plate (4, 7) has in its concavely-curved surface a fitting groove (8, 9), and the heat pipe (10) is arranged in a gap between the adjacent cells (2) while being held in said fitting groove.

25 3. The battery pack according to claim 1, wherein the

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heat collecting plate (4, 7) has, at least at its one end, a fixed heat dissipating portion (4a, 7a) which is extendedly formed so as to cover outermost cells (2), and said fixed heat dissipating portion is sandwiched between the outermost cells and an inner surface of the pack case 1.

4. The battery pack according to claim 1, further comprising a heat collecting plate (19) arranged between an uppermost or lowermost tier of the cells (2) and the inner surface of the pack case (1), the heat collecting plate being formed in a wave-like shape so as to make contact with the outer peripheral surfaces of said cells one by one.

5. The battery pack according to claim 1, wherein the fitting groove (8, 9) is formed on one surface of the heat collecting plate (4, 7) opposite to other surface thereof that makes contact with the cell (2).

6. The battery pack according to claim 1, wherein the heat pipe (10) is soldered to said heat collecting plate (4, 7), with its heating portion (10a) fitted into the fitting groove (8, 9) of the heat collecting plate (4, 7).

7. The battery pack according to claim 1, wherein a heat collecting plate (22) is formed from a laminate sheet, the heat collecting plate including a heat collecting plate portion (22a) having adhesive layers (22b, 22c) on both surfaces, and said heat collecting plate has no fitting groove but has said adhesive layer bonded to the heat pipe (10).

8. The battery pack according to claim 1, wherein the heat pipe (10) has a heating portion (10a) and a heat dissipating portion (10b), the heat dissipating portion being arranged perpendicular to the heating portion, and thus has a shape of a letter "L".

9. The battery pack according to claim 1, wherein a heat pipe (14) has two parallelly-arranged heating portions (14a, 14b), the heating portions being, at their one ends, coupled in communication to each other via a heat dissipating portion (14c), and a heat collecting plate (13) has parallelly-arranged fitting grooves (17, 18) to receive said two heating portions.

10. The battery pack according to claim 1, wherein heat-conductive grease is provided between the fitting groove (8, 9) of the heat collecting plate (4, 7) and the heating portion (10a) of the heat pipe (10).

11. The battery pack according to claim 1, wherein heat-conductive grease is provided between the receiving groove (11) of the heat dissipating member (3) and the heat dissipating portion (10b) of the heat pipe (10).

12. The battery pack according to claim 1, further comprising an elastic insulative member (12) having thermal conductivity and electric insulation property is interposed between an inner-surface of the heat dissipating member (3) and the cells (2) housed in an opening-end portion of the pack case (1), and said elastic insulative member is pressed by

said cell to push the heat dissipating portion (10b) of the heat pipe (10) into the receiving groove (11).

13. The battery pack according to claim 1, wherein the receiving groove (11) of the heat dissipating member (3) has a groove depth smaller than an outer diameter of the heat dissipating portion (10b) of the heat pipe (10), one half of the receiving groove on a groove-bottom side has an arc-shaped section whose radius is identical with a radius of said heat dissipating portion, and a width of a groove opening is made larger than an outer diameter of said heat dissipating portion.

14. A battery pack comprising:

a plurality of cells (2) stacked on top of one another in tiers;

a heat collecting plate (4, 7) made of a wave-like metal sheet, the heat collecting plate being interposed between tiers of the cells so as to make contact with part of an outer peripheral surface of each of upper and lower tiers of the cells alternately;

a heat pipe (10) having a heating portion (10a) fitted into a fitting groove (8, 9) formed in said heat collecting plate;

a resin-made pack case (1) for receiving the cells, the heat collecting plate, and the heat pipe at its opening;

a resin-made lid plate (23) for closing the opening of said pack case; and

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a heat dissipating member (27) fitted into a fitting recess (24) formed on an outer-surface side of said lid plate, the heat dissipating member having on its inner-surface side an engagement portion into which a heat dissipating portion 5 (10b) of the heat pipe, which is inserted through said lid plate, is fitted.

200710-16E81001